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Antiviral medicinal plants of Iran: A Review of Ethnobotanical evidence

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Abstract : Sometimes, available drugs fail to treat viral infections because of the emergence of drug resistance and some dormant and recurrent infections. Therefore, new antiviral combinations are increasingly required. Investigating medicinal plants and their compounds can be a fruitful approach. Therefore, this study sought to report the plants that are used to relieve and treat viral infections in the traditional cultures of Iran's different regions. According to the findings, totally 21 medicinal plants from 14 families are used to specifically treat viral infections according to traditional medicine. Most of the identified plants were from Euphorbiaceae, Lamiaceae, Myrtaceae and Rosaceae family. Phytochemical investigations and clinical assessments of the compounds of these plants can be an efficient approach to identify antiviral medicinal plants used to treat viral infections.

Keywords : Traditional culture, Natural medicine, Infection diseases, Antiviral agents, Iran.

Introduction

Medicinal plants have been used to treat diseases for centuries and are currently being considered a main approach to treatment in developed and developing countries [1]. Many of the drugs that are currently being prescribed are plant-based. One-fourth of the routinely used drugs contain at least one plant-based active compound [2]. Therefore, scientific and research centers are paying attention to medicinal plants. According to the traditional medicine of many countries, including Iran, medicinal plants are used to treat many diseases [3-7]. In ethnobotanical references of many countries, different uses of medicinal plants were comprehensively described. Phytotherapy has a long history in Iran, such that in old medical references of Iran, such as Avicenna works, this subject was comprehensively described. As well, some investigations have demonstrated that there are many approaches in Iranian traditional medicine to treat diseases [8-17], which is compatible with the geographical extension and widely varied vegetation of this country. Hosting over 9500 species of vascular plants, Iran enjoys vegetation even more varied than that of the whole Europe.

Ethnobotany is an approach to gain knowledge about traditional uses of medicinal plants. Ethnobotany refers to the study of how it is that the people from a culture, ethnic, or region do use the medicinal plants that are native to their region. The knowledge generated from such investigations can be highly valuable for the

researchers of other disciplines, especially pharmacognosy. Indeed, ethnobotany is an instrument to generate the knowledge of local people about uses of plants, especially therapeutic uses, in order to produce new commercial products. In the recent years, the findings of ethnobotanical works have contributed greatly to the studies conducted on medicinal plants and phytotherapy worldwide. In some countries, ethnobotanical studies have been conducted to discover and enhance new drugs [18-29,67-83]. In fact, ethnobotanical studies have paved the way for experimental studies and clinical assessments leading to the production of drugs. In this regard, many studies, inspired by ethnobotanical investigations, have been conducted in Iran to investigate the effects of medicinal plants and their known compounds in preventing and treating several diseases [30-45]. These investigations have led to the production of different, plant-based drugs.

Currently, viral infections are spreading rapidly. Using available drugs to treat viral infections has been occasionally unsuccessful because of certain reasons including emergence of drug resistance due to some mutations of viruses and dormant and recurrent infections. Therefore, new antiviral combinations are being increasingly sought out [46].

In this regard, investigating medicinal plants and their compounds can be a fruitful strategy [47]. Ethnobotanical studies can pave the way for doing such studies. Therefore, in the light of the necessity of treating viral diseases using more effective compounds and the significance of traditional medicine and ethnobotanical investigations to provide the relevant information to meet this requirement, this study was conducted to identify and report the plants that are used to relieve and treat viral infections according to the traditional culture of Iran's different regions.

In this review article, the key words including ethnobotany, ethnopharmacology, ethnomedicine, phytopharmacology, phytomedicine, traditional medicine, and Iran combined with antiviral, viral infection and viral diseases were searched for in Scopus, International Science Citation Center (ISC), and Magiran. Duplicate articles and the articles with no accessible full text were excluded from analysis.

The present study indicated that overall, Iran's people from different cultures and in various regions such as northeast coasts of Persian Gulf, and Turkmen Sahra of north of Iran and some other regions in Fars, Hamedan, Hormozgan, Isfahan, Kerman, Khuzestan, Kordestan, and Mashhad provinces use 21 medicinal plants from 14 families according to traditional medicine to specifically treat viral infections.

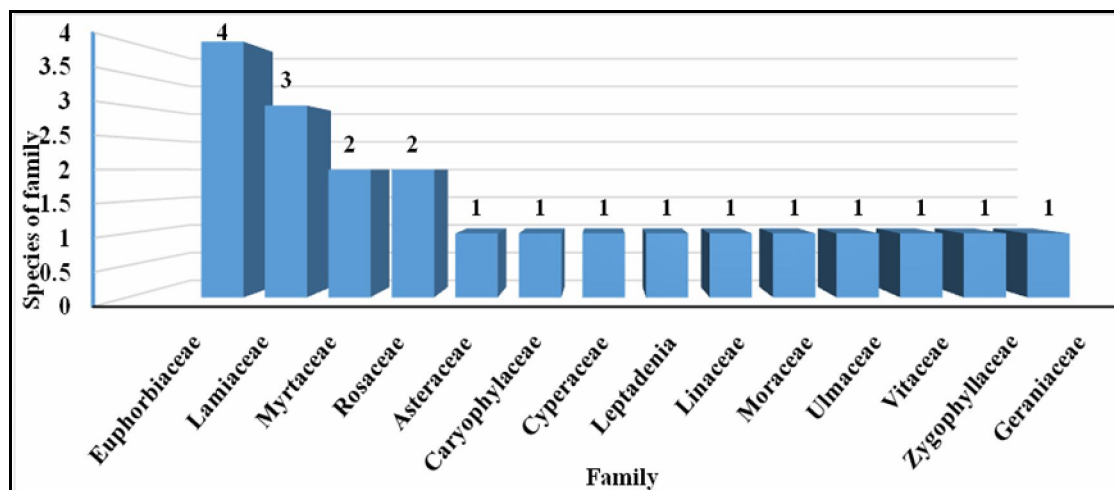


Figure 1: A number of plant species effective on viral infections from different families

Table 1: Medicinal plants effective on viral infections in different subcultures and regions of Iran

No.	Scientific name	Family	Local name	Used organs	Province	Ref.
1	<i>Melissa officinalis</i> L.	Lamiaceae	Varangboo	Aerial Parts	Kerman province	[48]
2	<i>Myrtus communis</i> L.	Myrtaceae	Moord	Aerial Parts	Kerman province	[48]
3	<i>Ficus carica</i> L.	Moraceae	Anjeir	Latex, Fruit	Turkmen Sahra, north of Iran and Arjan in Fars Province; Khuzestan Province;	[49-51]
4	<i>Ulmus minor</i> Mill.	Ulmaceae	Ouja	Bark	Khuzestan Province	[51]
5	<i>Rosa foetida</i> Herrm	Rosaceae	Nasrarane zard	Fruit, Glosbe, Receptacle	Zarivar, Kordestan province	[52]
6	<i>Rosa canina</i> L.	Rosaceae	Nasrarane vahshi	Flower, Glosbe, Receptacle	Zarivar, Kordestan province	[52]
7	<i>Erodium cicutarium</i> (L.) L Her.Ex Aiton, Hort.	Geraniaceae	Chomagho o	Root	Natanz region, Isfahan province	[53]
8	<i>Cichorium intybus</i> L.	Asteraceae	Sechertghi	Stem, Root	Turkmen Sahra, north of Iran	[49]
9	<i>Peganum harmala</i> L.	Zygophyllaceae	Espand	Seed	Turkmen Sahra, north of Iran	[49]
10	<i>Stachys turcomica</i> Trautv	Lamiaceae	Sim-kesh	Whole plant	Turkmen Sahra, north of Iran	[49]
11	<i>Euphorbia amygdaloides</i> L.	Euphorbiaceae	Awei-ternek	Latex	Turkmen Sahra, north of Iran	[49]
12	<i>E. marschalliana</i> Boiss	Euphorbiaceae	Awei-ternek	Latex, Aerial parts	Turkmen Sahra, north of Iran	[49]
13	<i>Vitis sylvestris</i> L.	Vitaceae	Uzum	Fruit, Seed, Leaf	Turkmen Sahra, north of Iran	[49]
14	<i>Euphorbia helioscopia</i> L.	Euphorbiaceae	Shir Shirook	Latex	Arjan in Fars Province	[50]
15	<i>Linum album</i> Ky. ex Boiss.	Linaceae	koom	Aerial Parts	Hamedan province	[54]
16	<i>Leptadenia</i>	<i>Leptadenia</i>	Shahm nar	Aerial parts	Hormozgan province	[55]
17	<i>Euphorbia bungei</i> Boiss.	Euphorbiaceae	Maya-oti	Latex	Maraveh Tappeh Region, North of Iran	[56]
18	<i>Acanthophyllum sordidum</i> Bunge ex Boiss.	Caryophyllaceae	Choobak	Root	Mashhad, Razavi Khorasan province	[57]
19	<i>Mentha longifolia</i> (L.) Hudson	Lamiaceae	Puneh	Aerial parts	Mashhad, Razavi Khorasan province	[57]
20	<i>Syzygium aromaticum</i> (L.)	Myrtaceae	Mikhak	Flower	Mashhad, Razavi Khorasan province	[57]
21	<i>Cyperus rotundus</i>	Cyperaceae	Oyar salam	Flower	Northeast Latrine Zone of Persian Gulf	[58]

In this review article which was conducted to report the plants that are used to relieve and treat viral infections in traditional cultures and ethnobotany of Iran's different regions, 21 medicinal plants from 14 families were reported to specifically treat viral infections. This highlights the richness of Iran's traditional medicine, which has long addressed use of nature-based products to treat different diseases such as infectious diseases.

Medicinal plants have traditional and various uses, one of which is to treat infectious diseases. According to reported figures, approximately 60% of anti-cancer and anti-infectious diseases are nature-based [59]. As a result, it is clear that traditional medicinal plants can be a suitable resource to discover and produce antiviral drugs. As well, novel investigations have demonstrated that certain medicinal plants, which are traditionally used, have antiviral effects [30, 34,60]. Moreover, the antiviral effects of several flavonoids [61, 62] and anthraquinones and their derivatives have been studied [63, 64].

According to the findings of this study, most antiviral plants are from family Euphorbiaceae. In the recent decade, some of the traditional uses of the family Euphorbiaceae have been investigated, with advances in medicine, to seek out drugs to treat diseases. Studies have demonstrated that many of the species from this family have antiproliferative, cytotoxic, antibacterial, antifungal, antipyretic, analgesic, and virus-inhibitory properties [60, 65]. The plants from this family are rich in sesquiterpenes, cerebrosides, glycerols, flavonoids, steroids, and polyphenols [65].

Besides that, the present study demonstrated that the plants from family Lamiaceae have been used to prevent and treat infectious diseases more frequently than the plants from other families. In other studies, the antiviral effects of some species from this family have been confirmed [66]. Phenolic compounds are the main compounds found in the plants from this family. The antiviral properties of plants seem to be due mainly to the presence of secondary metabolites, especially flavonoids, terpenes, and saponins.

Conclusion

It is very likely to achieve pharmaceutically effective substances through investigating medicinal plants. Phytochemical investigations and clinical trials have demonstrated that the compounds of the plants from families *Euphorbiaceae*, *Lamiaceae*, *Myrtaceae*, and *Rosaceae* can be investigated for the identification of antiviral medicinal plants used to treat viral infections.

Conflict of Interests

There is no any conflict of interest.

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